Survival of the Fittest

Survival of wireless semiconductor suppliers will be determined by how well they know their customers' customers.

By Ed Valdez, Motorola Semiconductor Products Sector

Know Thy Customer

During the last two years, the suppliers at the front end of the wireless consumer value chain have experienced tectonic shifts in the way they have evolved to serve their customers. A key question for wireless semiconductor suppliers is: Which companies will be the dinosaurs and which will adapt swiftly in 2003 and beyond?

The promise of anytime, anywhere consumer communications has fueled the growth of the cellular industry. Each year, more than 6-percent of the world's population purchase new cellular handsets &#151 about 400 million wireless phones per year. What other consumer business can design, manufacture and sell almost half a billion devices per year? Today, more than one billion people &#151 one out of every six people on the earth &#151 subscribe to cellular phone services. Yet nearly two-thirds of the earth's population still does not have any phone service (wireline or wireless). So the potential for new wireless business is huge and the entrenched Tier 1 handset suppliers and growing number of Tier 2 and Tier 3 players have unleashed a feeding frenzy for every point of market share.

Just as a cataclysmic event led to the mass extinction of dinosaurs, the global macroeconomic downturn in 2001-2002 saw trillions of dollars of corporate value disappear with the mass extinction of international companies through bankruptcy, acquisition, or insolvency. This era has changed the wireless supplier landscape and caused a slow recovery of wireless businesses combined with the evolution of more adaptive business models that will provide a new backbone for future wireless growth. Suppliers have had to change the way they do business with their direct customers, who continue to morph into an ever-more dynamic supply chain.

Wireless handset original equipment manufacturers (OEMs) have outsourced to original design manufacturers (ODMs), electronic manufacturing services industries (EMSIs) and independent design houses (IDHs). ODMs have evolved up the value chain to be combination OEM/ODMs. EMSIs and IDHs are evolving to be ODMs while still providing EMSI and IDH services. These and other possible business models have raised expectations from the wireless semiconductor supplier companies that serve them. Those suppliers have rapidly evolved from providing point solutions, to

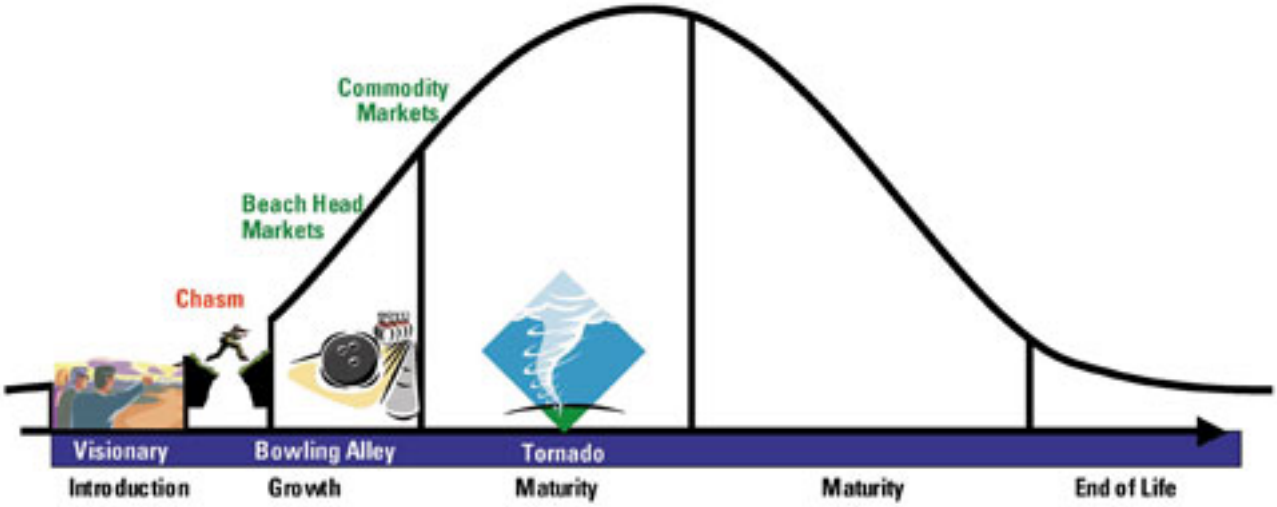
chipsets, to platforms and to total system solutions that provide everything from service and support to full type approval (FTA).

Ultimately, however, the survival of the wireless semiconductor suppliers will not be determined by how well they serve their direct customers, but by how well they know their customers' customers &#151 the consumers who are buying the handsets, wireless personal digital assistants (PDAs), and smart phones of tomorrow.

A Brief History of Platforms

How did the wireless semiconductor industry get to be where it is today? At the turn of the century there were only a handful of companies providing wireless chipsets, primarily for Global System for Mobile communication (GSM) voice-centric phones. With the initial launch of General Packet Radio Services (GPRS) capability at the end of 2000, the level of complexity of the technology being used increased threefold. For example, the number of test cases required for GSM numbered about 200, while at least 600 test cases were necessary to certify GPRS/GSM. Increased complexity required an increase in research and development investment in order to meet the initial and ever-evolving technology that provided competitive data speeds and enabled more feature-rich infotainment services for consumers. In addition, major handset manufacturers continued to simplify the supply chain &#151 the fewer suppliers the better - so that economies of scale could be best realized with high volume purchases from only a few highly qualified suppliers.

These driving forces raised the bar for wireless semiconductor platform suppliers to fuel the volume ramp required for GPRS handsets delivered to consumers in 2001 and 2002. Beginning with July 2001, evolution of chipset and platform providers to total system solution providers accelerated as wireless semiconductor suppliers repositioned themselves to deliver not only branded handsets, but also to provide total system solutions to other OEMs, ODMs, and IDHs which need GSM, GPRS, and Universal Mobile Telecommunications Service (UMTS) technologies to design, manufacture, and sell their own handsets. Some companies, such as Motorola, were capable of marketing total system solutions by leveraging platform solutions previously delivered only to internal customers, while others were compelled to announce partnerships, mergers, or acquisitions in order to fill the gaps. It was a landmark shift; companies could now provide &#151 albeit with differing degrees of integration &#151 one-stop shopping for a broad portfolio of platform technologies &#151 including chipsets, reference designs, protocol stack software, applications, development tools and support to FTA. However, those partnerships, alliances, and acquisitions have now blurred the distinction between platform software suppliers and what were formerly separate device or chipset providers.



Within the technology adoption lifecycle, wireless semiconductor suppliers reside in the 'Tornado Zone,' shifting their focus from customers to competitors in order to compete in a maturing market.

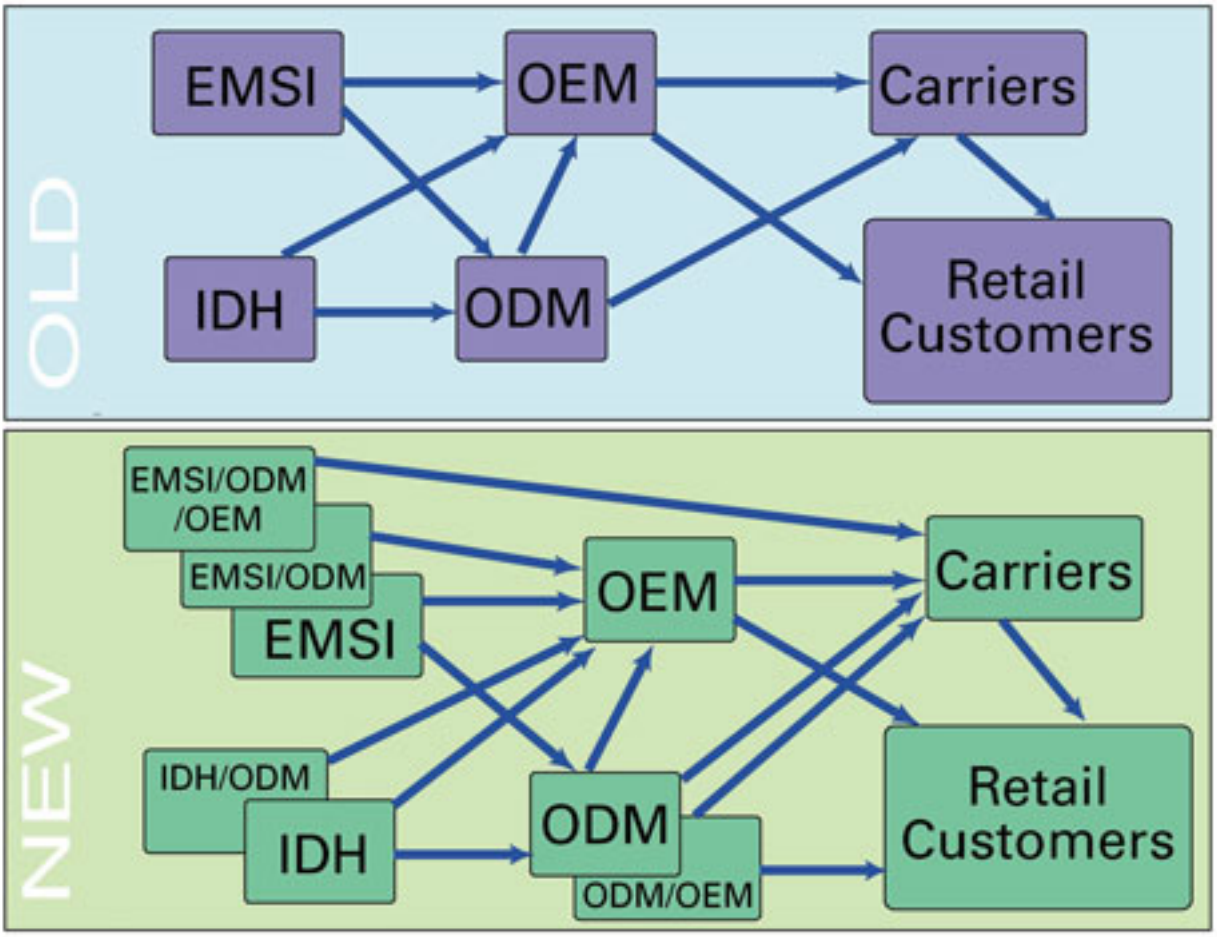
Déjà vu: Parallels to the Computer Industry

There should be no surprise in witnessing these cellular industry trends. We have seen them before in the PC industry. If we compare the milestones of both industries, it is clear that cellular parallels the PC evolution, with an average lag of five years. The parallels extend to the supply chain as well, since some of the same names involved in the ODM of PCs &#151 Acer (now known as BenQ), Compal, GVC, etc. &#151 have evolved to be ODMs of global cellular phones, many producing their own branded phones in their respective regions. Yet there has been an important distinction between these two markets: the average consumer PC is still selling for just under $1,000, while the average cellular phone sells for a little over $100 &#151 a 10X difference in value. Consumers understand the difference in computing performance needs between a PC and a nearly ubiquitous, ultramobile communication link &#151 their cellular phone. The vast majority of consumers around the world still prefer a voice-centric rather than a data-centric (computing intensive) cellular phone. Of course, like the PC industry and other consumer businesses, what were initially identified as high-tier features tend to become entry-level requirements for low-tier phones as time progresses. Yet, while today's mainstream PCs have 1 - 2 GHz processors powering them, cellular features at the 2.5G data rates require a microcontroller (MCU) at roughly 52 MHz and a digital signal processor (DSP) at just over 100 MHz. When you compare the total computing power required for a computer/laptop versus a mainstream GSM/GPRS mobile phone, there again is a 10X delta in computing power. The battery life expectations that consumers have are also vastly different. A laptop may last four hours with a single laptop battery, while a mobile phone is expected to last 10X that on a single battery. With these vital differences between the two industries, where is the value for the wireless semiconductor suppliers?

Value Migration: &quotWe're not in Kansas any more.&quot

In his classic about the technology adoption lifecycle, Crossing the Chasm, Geoffrey

Moore coined the term &quotTornado Zone&quot to describe the transition that occurs between the time at which a company establishes product beachheads (Moore's &quotBowling Alley&quot zone) and the time when those products become commodities. The tornado zone is an appropriate descriptor for the state of wireless semiconductor suppliers today as much of the focus shifts from the customer to the competitor. And as Dorothy said to her faithful dog in The Wizard of Oz, &quot...I have a feeling we're not in Kansas anymore.&quot



The evolution of the wireless handset value chain has created total system solution providers and blurred the distinctions between platform software suppliers and what were formerly separate chipset providers.
Just as Dorothy had the Scarecrow, the Tin Man, and the Lion, wireless platform suppliers have scurried to identify who or how they will provide optimized hardware, software and system integration expertise to get their customers' products from design to certification to mass production. Without value or competencies in all of those areas, customers will choose competing solutions that can more easily allow them to follow the yellow brick road to market success.

Those that take the &quotsurvival of the fittest&quot mentality will be the survivors, since the industry's tornadoes have caused significant damage and casualties. In the &quotChipset and System Trends for Mobile Handset Devices&quot research brief, Gartner Dataquest's Alan Brown recommends that suppliers:

&#149 Provide a chipset embedded in a reference design
&#149 Leverage significant wireless systems expertise
&#149 Increase RF modularity to make it easier for digital designers with limited radio experience
Wireless platform suppliers need to provide value in those areas as a baseline, yet equally important is the need to provide differentiation through third-party applications. While some software providers have chosen to focus on optimizing their software for a given hardware platform, they need to redo their porting efforts for every separate hardware platform. The &quotwrite once, run anywhere&quot standard provided by Java 2 Platform Micro Edition&#153 (J2ME) allows third-party developers to build intelligent, connected Java applications through a set of application programming interfaces (APIs) that provide access to the wireless communication resources on a platform. At some point in this wireless evolution, all handsets will likely be J2ME-enabled. It is by relentlessly pursuing features for which consumers will pay &#151 like imaging &#151 that wireless platform suppliers can protect themselves from being eaten alive in the Darwinian jungle.

What's Next? One Chip Dreams: Fact vs. Fiction

Keeping costs down while adding features with high utility value is what consumers want. So how do semiconductor suppliers respond? With a single-chip phone? Not exactly. Consumers don't care what's inside a wireless phone as long as it works with the right set of features at the right price with good quality service. Otherwise, there would have been single-chip wireline phones, cordless phones and laptops a long time ago but there aren't any that include all the necessary functions &#151 logic, analog and memory &#151 on one process technology. In fact, some of the announced solutions leverage stacked die, which is not a single-chip solution, but multiple chips mounted in a single package.

In addition, power amplification requirements via some type of module are also excluded in the one-chip race. This means, at the very least, that any forecasted platform solution will be a two-chip platform with some minimum number of passives required. So what is driving the push for a one-chip wireless phone?

The race toward a one-chip wireless phone has accelerated. Since Motorola's 2001 announcement of its integration leadership &#151 as low as 125 components for its i.250 GSM/GPRS platform &#151 both Intel and Texas Instruments have developed their own one-chip plans. Yet OEMs and ODMs must balance tradeoffs between cost reduction and integration in manufacturing handsets that consumers are willing to buy. The ODMs who have built PCs and are now building cellular phones know that it is often cheaper to pick and place ICs on a board than to buy an integrated module that has ICs and passives already included.

The best solution is to optimize integration to provide the best system cost. Optimizing system cost means providing scalability for low-, mid- and high-tier platforms with minimal cost differences between the tiers. Minimizing the cost of scalability will help the handset providers deliver a wide range of unique value across different consumer segments.

In conclusion, wireless platform suppliers will be fit to survive the evolution of the wireless industry if they:
&#149 Know thy customer (customer's customer - the end user)
&#149 Leverage the differences between the PC industry evolution and the cellular evolution
&#149 Focus on consumer value
&#149 Avoid the one-chip race by optimizing system cost.

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